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EXAMINER

RO. B

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2837

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
**09/449,762**

Applicant(s)  
**Lee**

Examiner  
**Bentsu Ro**

Art Unit  
**2837**



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10/24/00 and 4/19/01.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-6 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 20) ☐ Other:

### THIRD OFFICE ACTION -- A NONFINAL REJECTION

1. The amendment filed October 24, 2000 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The insert paragraph to page 10, line 18:

- **“Thus, the XY stage 230 is coupled to followers 272, 282 of the reaction frame 261 exclusively by the Lorentz force between the magnet drive tracks (278, 278', 288, 288') and their corresponding coils (242X, 242X', 244Y, 244Y').”**

Wherein, the phrase “Lorentz force” is new matter. Applicant is required to cancel the new matter in the reply to this Office action.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2-3 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- The “Lorentz force” in claim 2 is a new matter. Nowhere in the currently filed specification or in the parent specifications has applicant disclosed the “Lorentz force”.
- The “Lorentz force”, according to the well-known physics, requires both the magnetic field and the electric field. See the physics textbook: Fishbane et al, *“Physics for Scientists and Engineers”*, Second Edition, Volume II, pages 781-782. Prentice Hall Publishing, New Jersey. 1996.

- According to SAMS "Modern Dictionary of Electronics", sixth edition, "Lorentz force" is defined as "the force exerted by an electric field and a magnetic field on a moving electric charge."

The Lorentz force is a force produced by both electric field and magnetic field onto a movement of an electric charge (or charge movement inside an electric wire). Applicant does disclose the magnetic field produced by the motor coil 68A and magnetic track 70A, see Fig. 2 of this instant disclosure. However, applicant has never disclosed an electric field. To produce an electric field, it requires two parallel electric plates having potential difference applied therebetween. Applicant has never disclosed such a structure. Therefore, using the phrase "Lorentz force" to describe a magnetic force alone is inaccurate.

In view of the foregoing reasons, the Lorentz force is (1) a new matter and is not supported by applicant's disclosure, and (2) use "Lorentz force" to describe a magnetic force alone is inaccurate, the "Lorentz force" is a force produced by both magnetic and electric fields, not magnetic field alone.

A copy of pages 781-782 of the Fishbane et al physics textbook and the SAMS definition of "Lorentz force" are attached to the end of this office action for applicant's reference.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Itoh et al US Patent No. 5,260,580.

The Itoh et al reference has been cited and used to reject these claims in the paper # 5.

Claims 1 and 2 read onto Itoh et al teaching as follows:

**Claims 1 & 2:**

Claim 1. A positioning device with an object table

and a drive unit by which the object table is displaceable

over a guide parallel to at least an x-direction,

**Itoh et al teaching:**

Fig. 2 shows a positioning device with a movable stage 2;

the second linear motor 7 is a driving unit;

the guide plates 31<sub>1</sub> and 31<sub>2</sub>;

which guide is fastened to a first frame of the positioning device

while a stationary part of the drive unit is fastened to a second frame of the positioning device

which is dynamically isolated from the first frame,

wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

Claim 2. A positioning device as claimed in claim 1, wherein the object table is coupled to the stationary part of the drive unit exclusively by a Lorentz force of a magnet system and an electric coil system of the drive unit during operation.

5. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Reeds** US Patent No. 4,891,526.

Reeds teaches the same subject matter as claimed, see the following comparison.

the first frame reads onto the stationary base 1 which the guide plates 31<sub>1</sub> and 31<sub>2</sub> fastened thereto;

the drive coils 71 is a stationary part of the second linear motor 7;  
the support plates 8<sub>1</sub> and 8<sub>2</sub> constitute a second frame which support the drive coils 71;

it is noted that the support plates 8<sub>1</sub> and 8<sub>2</sub> are dynamically isolated from the stationary base 1;  
the stationary base 1, as mentioned previously is a first frame;

see text, for example, column 6, lines 15-20, recited as "*However, since the row of drive coils 71 of the second linear motor 7 is mechanically separated from the second yoke 72, the vibration of the second drive coils 71 does not affect the stationary base 1 and the movable stage 2 in the subsequent positioning operation.*";  
another example is shown in column 5, lines 64-68.

as shown in Fig. 2, the movable stage 2 is placed on the top of the stationary base 1; the movable stage 2 is supported by the magnetic force between the drive coils 71 and permanent magnets 73<sub>1</sub>, 73<sub>2</sub>.

**The claims:**

Claim 1. A positioning device with an object table

and a drive unit by which the object table is displaceable

over a guide parallel to at least an x-direction,

which guide is fastened to a first frame of the positioning device

while a stationary part of the drive unit is fastened to a second frame of the positioning device

**Reeds teaching:**

Reeds teaches a positioning device;  
Figs. 1 and 3 both show an x-y stage plate 12 which is an object table;

Fig. 3 shows an x-drive motor 61 and a y-drive motor 36;

Fig. 3 also clearly shows the drive motors 61 and 36 displacing the stage plate 12 via driving bars 68 and 50, respectively;

Fig. 1 shows linear bearings 14a, 14b, 18a, 18b;

the linear bearings 14a and 14b move in the x-direction, therefore, bearings 14a and 14b are parallel at least to x-direction;

these linear bearings 14a, 14b, 18a, 18b are all fastened to a  $\theta$ -stage platform 20 as clearly shown in Fig. 1, therefore, the  $\theta$ -stage platform 20 is a first frame;

Fig. 7 shows a y-drive motor 36 mounted on a base 28, therefore, the base 28 is a second frame;

Fig. 1 shows the relative position of the base 28, the platform 20 and the linear bearings 14a, 14b, 18a, 18b;

column 5, lines 1-7 states that the three drive mechanisms (x, y,  $\theta$ ) are very similar; specifically, lines 6-7 states that "a y-drive motor 36 is mounted on a flange 38 which is secured to the bottom of base 28.";

Fig. 3 shows the similarity of the x, y,  $\theta$ -drive mechanisms (i.e. drive motors 61, 36, 83);

which is dynamically isolated from the first frame,

wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

Claim 2. A positioning device as claimed in claim 1, wherein the object table is coupled to the stationary part of the drive unit

exclusively by a Lorentz force of a magnet system and an electric coil system of the drive unit during operation.

Fig. 1 shows the dynamical isolation of the base 28 (the second frame) from the  $\theta$ -stage platform 20 via a vertical adjustable flexible mount 26a;  
column 9, lines 4-8 describes the spring constant of the flexible mounts 26;  
lines 21-26 describes the minimization of reaction force impact by selecting three proper support points;

because the drive motors 61 and 36 (Fig. 3) are mounted on the base 28 (the second frame, see Fig. 1), the reaction force exerted by the object table on the drive motors 61, 36 as well as the driving force exerted by the drive motors on the stage plate 12 is transmittable exclusively into the base 28 (the second frame).

the stationary part of the drive unit reads onto the stators of the motors 61 and 36, see Fig. 3;  
the x-y stage plate 12 is coupled to the stator of the motors 61, 36 via the drive bars 68, 50, the capstans 62, 44 and the rotors of the motors (no reference numeral);

the rotor contains a magnet system whereas the stator contains an electric coil system (this is a conventional motor structure);  
the motor rotates via the interaction of magnetic force produced by the magnetic flux of the rotor and the magnetic flux of the stator (this is a basic principle of motor operation).

6. Claims 4-6 are allowable.

7. Claim 3 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. Applicant's argument (paper #7, filed 10/24/2000) has been fully considered. With respect to the Itoh's reference, applicant argues that the examiner who issues the patent 6,072,183 (a continuous of patent 5,260,580) has considered the Itoh's reference. This argument is non-convincing. Applicant has failed to specifically point out the difference between the claimed subject matter and Itoh's teaching, and further specifically point out the allowable subject matter over Itoh's teaching.

With respect to Reeds patent 4,891,526, **applicant argues:**

- The flexible mounts 26a-26c are well known metal diaphragms that are designed to be stiff in the horizontal direction while allowing for movement in the vertical direction.

Applicant further cites Reeds statement in column 2, lines 45-46, column 9, lines 16-21 and column 9, 21-26 where Reeds states "the center of rotation for the rotating stage does not move relative to the beam axis." to support that there is no lateral displacement is permitted between the base 28 and the platform 20.

**(Examiner's response):** claim 1 does not set forth any limitation to the direction of the reaction force, as long as the flexible mounts 26a-26c absorb force, the requirement of claim 1 is met.

- The mounts 26 are very stiff.

**(Examiner's response):** The stiffness is not the issue as long as the mounts do absorb the force.

**Examiner's further comments:**

- One who studies machine elements knows that the center hub 126a (see Reeds Fig. 6) can be bent with respect to the rim of the flexible mount. This angular movement will absorb the horizontal force.
- The magnitude of the bent is not an issue as long as the flexible mount can function as such.
- Reeds calls the mounts 26a "flexible", therefore, the mounts must be able to absorb certain force. The direction of the force absorption and the magnitude of the force absorption are not the issues at all as long as the mounts can function to absorb force.



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9. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number (703) 308-3656.

June 5, 2001

Bentsu Ro  
**BENTSU RO**  
**PRIMARY EXAMINER**